

भारतीय मानक

रेडियो फ्रीक्वेंसी संयोजक

भाग 8 विषय विशिष्टि — बेअर्नेट लॉक सहित 6.5 मिमी (0.256 इंच)
आंतरिक व्यास के बाह्य चालक वाले रेडियो फ्रीक्वेंसी समाक्ष संयोजक —
लाक्षणिक प्रतिबाधा 50 Ω (टाइप बी.एन.सी.)

Indian Standard

RADIO FREQUENCY CONNECTORS

PART 8 SECTIONAL SPECIFICATION — RF COAXIAL CONNECTORS
WITH INNER DIAMETER OF OUTER CONDUCTOR 6.5 mm (0.256 in)
WITH BAYONET LOCK — CHARACTERISTIC IMPEDANCE 50 Ω (TYPE BNC)

ICS 29.120.20

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BUREAU OF INDIAN STANDARDS
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NATIONAL FOREWORD

This Indian Standard (Part 8) which is identical with IEC 61169-8 : 2007 'Radio-frequency connectors — Part 8: Sectional specification — RF coaxial connectors with inner diameter of outer conductor 6,5 mm (0,256 in) with bayonet lock — Characteristic impedance 50 Ω (type BNC)' issued by the International Electrotechnical Commission (IEC) was adopted by the Bureau of Indian Standards on the recommendation of the Electromechanical Components and Mechanical Structures for Electronic Equipment Sectional Committee and approval of the Electronics and Information Technology Division Council.

The text of IEC Standard has been approved as suitable for publication as an Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

- a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.
- b) Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

The technical committee has reviewed the provisions of the following International Standards referred in this adopted standard and has decided that they are acceptable for use in conjunction with this standard:

| <i>International Standard</i> | <i>Title</i> |
|-------------------------------|--|
| IEC 60068-1 : 1982 | Environmental testing — Part 1: General and guidance |
| IEC 60096-2 | Radio-frequency cables — Part 2: Relevant cable specifications |
| IEC 61169-1 : 1992 | Radio frequency connectors — Part 1: Generic specification — General requirement and measuring methods |

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

RADIO FREQUENCY CONNECTORS

PART 8 SECTIONAL SPECIFICATION — RF COAXIAL CONNECTORS WITH INNER DIAMETER OF OUTER CONDUCTOR 6.5 mm (0.256 in) WITH BAYONET LOCK — CHARACTERISTIC IMPEDANCE 50 Ω (TYPE BNC)

1 Scope

This part of IEC 61169, which is a sectional specification (SS), provides information and rules for the preparation of detail specifications (DS) for RF coaxial connectors which may preferably be used with RF cables 60096 IEC 50-3 of IEC 60096-2. These connector patterns are for low power, quick connect/disconnect applications using a bayonet type coupling mechanism and are commonly known as type "BNC".

It describes the interface dimensions for general purpose connectors, dimensional details for standard test connectors together with gauging information and the mandatory tests selected from IEC 61169-1, applicable to all DS relating to type BNC connectors.

This specification indicates the recommended performance characteristics to be considered when writing a DS and covers test schedules and inspection requirements.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60068-1:1988, *Environmental testing – Part 1: General and guidance*
Amendment 1 (1992)

IEC 60096-2, *Radio-frequency cables – Part 2: Relevant cable specifications*

IEC 61169-1:1992, *Radio-frequency connectors – Part 1: Generic specification – General requirements and measuring methods*

3 IEC type designation

Connectors of this standard shall be designated by:

- a) the reference to this standard, 61169-8 IEC;
- b) a serial number (see Clause 6);
- c) a letter corresponding to the climatic category (see 7.2).

Example:

61169-8-IEC-1A denotes a free pin connector belonging to climatic category 40/85/21 to be used with an RF coaxial cable 60096 IEC 50-3-1/3/4.

NOTE The type designation used in this standard is provisional. A final type designation is under consideration.

4 Interface dimensions

4.1 Dimensions – General purpose connectors

The original dimensions are in inches.

All undimensioned pictorial configurations are for reference purposes only.

4.1.1 Pin connector

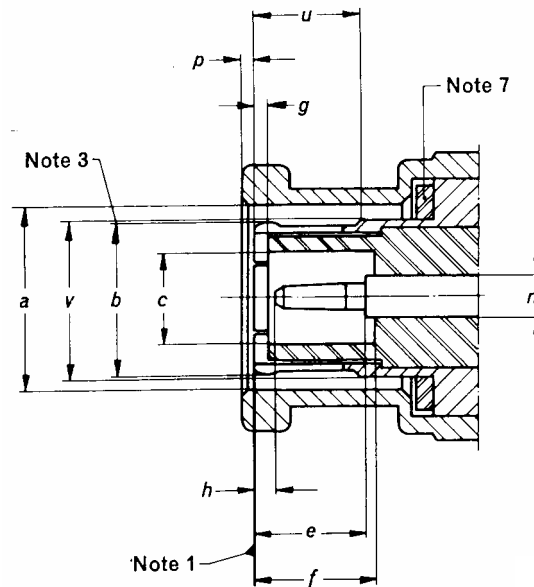


Figure 1 – Connector with pin-centre contact (for dimensions, see Table 1)

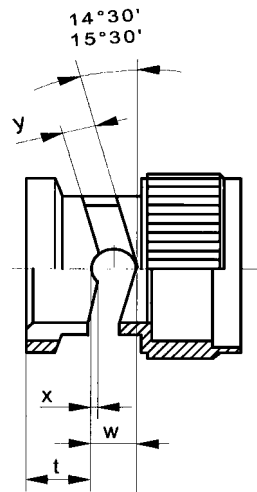
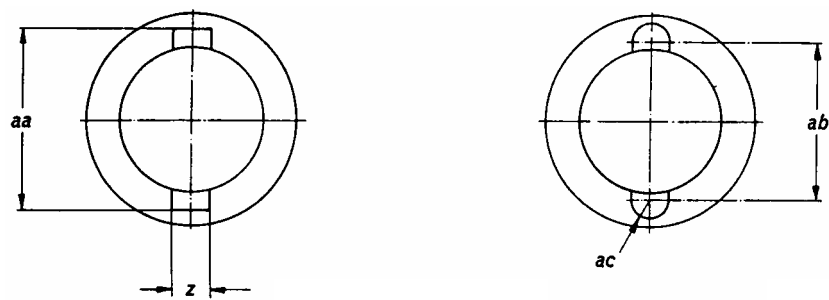


Figure 2 – Details of bayonet lock



Figures 3 and 4 – Details of alternative coupling grooves

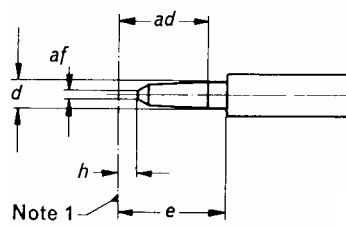


Figure 5 – Details of pin-centre contact

Table 1 – Dimensions for connector with pin-centre contact

| Reference | mm | | inch | | Note |
|---|------------|------|-------------|-------|-----------|
| | Min. | Max. | Min. | Max. | |
| a | 9,78 | 9,91 | 0,385 | 0,390 | 9/diam. |
| b | – | – | – | – | 3/9/diam. |
| c | 4,83 | – | 0,190 | – | 9/diam. |
| d | 1,32 | 1,37 | 0,052 | 0,054 | 9/diam. |
| e | 5,33 | – | 0,210 | – | |
| f | 5,28 | – | 0,208 | – | |
| g | 0,15 | – | 0,006 | – | |
| h | 0,08 | 1,02 | 0,003 | 0,040 | |
| m | 2,140 nom. | | 0,0842 nom. | | diam. |
| p | 1,44 nom. | | 0,057 nom | | 10 |
| u | 5,38 | – | 0,212 | – | |
| v | – | 8,18 | – | 0,322 | 9/diam. |
| z | 2,31 | 2,46 | 0,091 | 0,097 | 6 |
| aa | 11,76 | – | 0,463 | – | 6 |
| ab | 10,14 nom. | | 0,399 nom. | | 6 |
| ac | 1,14 | – | 0,045 | – | 6/rad. |
| ad | 1,96 | 3,05 | 0,077 | 0,120 | |
| af | – | 0,64 | – | 0,025 | diam. |
| t | 4,47 | 4,67 | 0,180 | 0,184 | |
| w | 3,15 | – | 0,124 | – | |
| x | 0,46 | 0,56 | 0,018 | 0,022 | |
| y | 2,31 | 2,46 | 0,091 | 0,097 | |
| NOTE 1 Mechanical and electrical reference plane. | | | | | |
| NOTE 3 Slotted and flared to meet gauge test according to 5.1.1. | | | | | |
| NOTE 6 It is permitted to use either Figure 3 or Figure 4. | | | | | |
| NOTE 7 Sealing gasket to meet required electrical and environmental performance. | | | | | |
| NOTE 9 Diameters shall be gauged to ensure that on mmC each feature is on or can take up a common axis. | | | | | |
| NOTE 10 This dimension shows the position when the bayonet sleeve is locked. | | | | | |

4.1.2 Socket connector

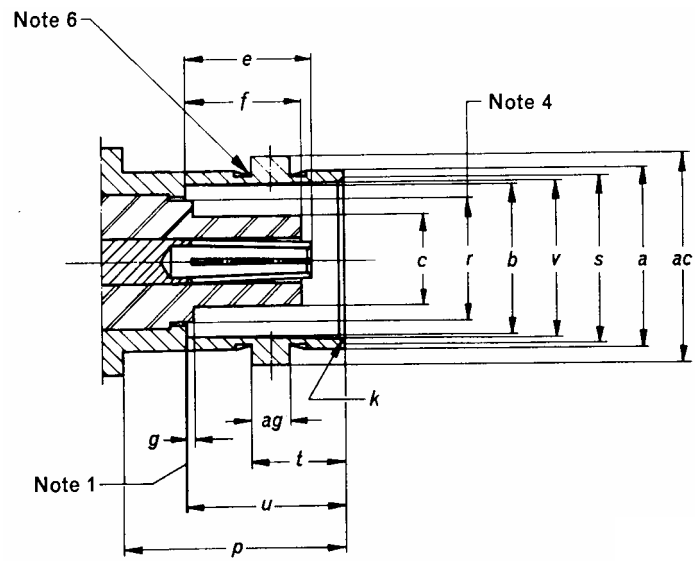


Figure 6 – Connector with socket-centre contact (for dimensions, see Table 2)

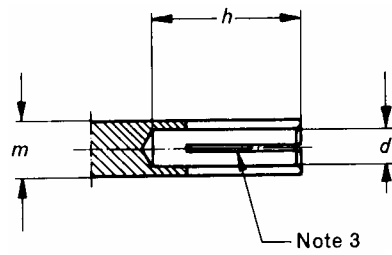


Figure 7 – Details of socket-centre contact

Table 2 – Dimensions for connector with socket-centre contact

| Reference | mm | | inch | | Note |
|-----------|------------|-------|-------------|-------|-----------|
| | Min. | Max. | Min. | Max. | |
| a | 9,60 | 9,70 | 0,378 | 0,382 | 9/diam. |
| b | 8,10 | 8,15 | 0,319 | 0,321 | 9/diam |
| c | — | 4,72 | — | 0,186 | 9/diam. |
| d | - | - | - | - | 3/9/diam. |
| e | 4,55 | 5,23 | 0,179 | 0,206 | |
| f | - | 5,28 | - | 0,208 | |
| g | - | 0,15 | - | 0,006 | |
| h | 4,95 | - | 0,195 | — | |
| k | — | — | — | — | 8 |
| m | 2,140 nom. | | 0,0842 nom. | | diam. |
| p | 10,52 | - | 0,414 | — | |
| r | — | 6,50 | — | 0,256 | 4/diam. |
| s | 8,79 | 9,04 | 0,346 | 0,356 | diam. |
| t | 5,18 | 5,28 | 0,204 | 0,208 | |
| u | 8,31 | 8,51 | 0,327 | 0,335 | |
| v | 8,31 | 8,46 | 0,327 | 0,333 | 9/diam. |
| ac | 10,97 | 11,07 | 0,432 | 0,436 | 9 |
| ag | 1,91 | 2,05 | 0,075 | 0,081 | diam. |

NOTE 1 Mechanical and electrical reference plane.
 NOTE 3 Slotted and closed to meet requirements of 5.1.2.
 NOTE 4 Applies only when dielectric extends beyond reference plane.
 NOTE 6 A concave depression between studs is permissible.
 NOTE 8 Chamfer or radius.
 NOTE 9 Diameters shall be gauged to ensure that on mmC each feature is on or can take up a common axis.

5 Mechanical gauges and standard test connectors

5.1 Mechanical gauges

5.1.1 Connectors with pin centre contact

5.1.1.1 Gauge for outer contact of pin connector

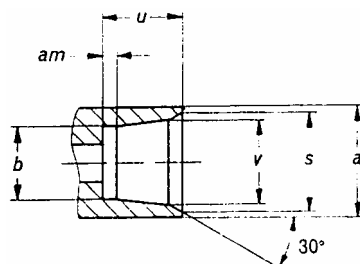


Figure 8 – Gauge for outer contact of pin connector

Table 3 – Dimensions for gauges for outer contact of pin connector

| Gauge A (for sizing purposes) | | | | | Gauge B (for measurement of gauge retention force for outer conductor) Mass (weight) of gauge: 225 ± 5 g | | | |
|---|-----------|------|------------|-------|---|------|------------|-------|
| Reference | mm | | inch | | mm | | inch | |
| | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. |
| <i>a</i> ϕ | 9,63 | 9,68 | 0,379 | 0,381 | 9,63 | 9,68 | 0,379 | 0,381 |
| <i>b</i> ϕ | 8,08 | 8,10 | 0,318 | 0,319 | 8,15 | 8,18 | 0,321 | 0,322 |
| <i>u</i> | 8,41 | 8,46 | 0,331 | 0,333 | 8,36 | 8,41 | 0,329 | 0,331 |
| <i>v</i> ϕ | 8,31 | 8,36 | 0,327 | 0,329 | 8,41 | 8,46 | 0,331 | 0,333 |
| <i>s</i> ϕ | 8,79 nom. | | 0,346 nom. | | 8,79 nom. | | 0,346 nom. | |
| <i>am</i> | 4 nom. | | 0,157 nom. | | 4 nom. | | 0,157 nom. | |
| Material: steel, polished; surface roughness: Ra = 0,4 μm (16 μin) maximum. | | | | | | | | |

5.1.1.2 Test sequence

Gauge A shall be placed over the outer electrical contact of the connector once. This is a sizing operation and should be carried out when the insulator is removed from the connector.

After this the gauge B shall be placed over the outer contact in a vertical position. The gauge shall be retained.

This test can also be carried out on connectors when the insulator is not removed.

5.1.2 Connectors with socket-centre contact

5.1.2.1 Gauge pin for socket-centre contact

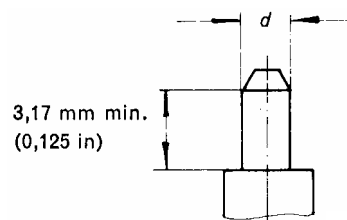


Figure 9 – Gauge pin for socket-centre contact

Table 4 – Dimensions for gauge pin for socket-centre contact

| Gauge C (for sizing purposes) | | | | | Gauge D (for measurement of gauge retention force for inner conductor) Mass (weight) of gauge: 57 ± 1 g | | | |
|---|-------|-------|--------|--------|--|-------|--------|--------|
| Reference | mm | | inch | | mm | | inch | |
| | min. | max. | min. | max. | min. | max. | min. | max. |
| <i>d</i> ϕ | 1,372 | 1,377 | 0,0540 | 0,0542 | 1,308 | 1,321 | 0,0515 | 0,0520 |
| Material: steel, polished: surface roughness: Ra = 0,4 μ m (16 μ in) max. | | | | | | | | |

5.1.2.2 Test sequence

A test pin gauge C shall be inserted into the centre contact a minimum distance of 3,17 mm (0,125 in) once. This is a sizing operation and should be carried out when the insulator is removed from the connector.

After this the gauge D shall be inserted in the vertical position. The gauge shall be retained.

This test can also be carried out on connectors when the insulator is not removed.

5.1.3 Gauge for outer contacts, coupling mechanism and mating face dimensions

A steel standard mating part shall be constructed as shown in Figure 10 for the connector and shall have a $0,4\text{ }\mu\text{m}$ ($16\text{ }\mu\text{in}$) maximum finish. The longitudinal force required to engage or disengage a pin connector shall not exceed 20 N.

The torque required to engage or disengage the bayonet lock of the pin connector shall not exceed 0,25 Nm.

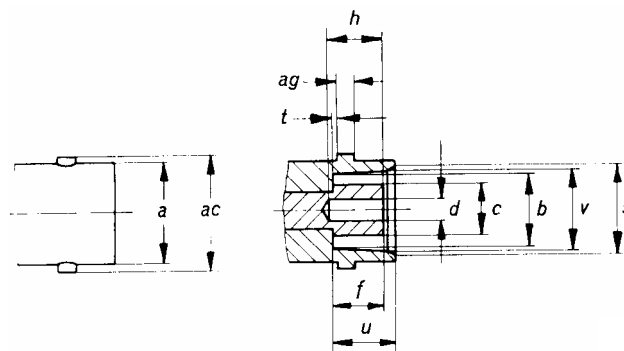


Figure 10 – Dimensions of gauge for performance test (see Table 5)

Table 5 – Dimensions of gauge for performance test

| Reference | mm | | inch | | Note |
|-----------|--------|--------|-------|-------|-------|
| | Min. | Max. | Min. | Max. | |
| <i>a</i> | 9,627 | 9,677 | 0,379 | 0,381 | diam. |
| <i>b</i> | 8,10 | 8,128 | 0,319 | 0,320 | diam. |
| <i>c</i> | 4,67 | 4,72 | 0,184 | 0,186 | diam. |
| <i>d</i> | 1,42 | – | 0,056 | | diam. |
| <i>f</i> | 5,21 | 5,28 | 0,205 | 0,208 | |
| <i>h</i> | 4,95 | – | 0,195 | – | |
| <i>s</i> | 8,79 | 8,865 | 0,346 | 0,349 | diam. |
| <i>t</i> | 2,870 | 3,142 | 0,113 | 0,124 | |
| <i>u</i> | 8,41 | 8,46 | 0,331 | 0,333 | |
| <i>v</i> | 8,30 | 8,382 | 0,327 | 0,330 | diam. |
| <i>ac</i> | 11,024 | 11,074 | 0,434 | 0,436 | diam. |
| <i>ag</i> | 1,98 | 2,03 | 0,078 | 0,080 | |

5.2 Standard test connectors

Standard test connectors are mainly used as part of the adaptor to the measuring equipment to carry out reflection coefficient measurement according to 9.2.1 of IEC 61169-1.

5.2.1 Standard test connector with pin contact

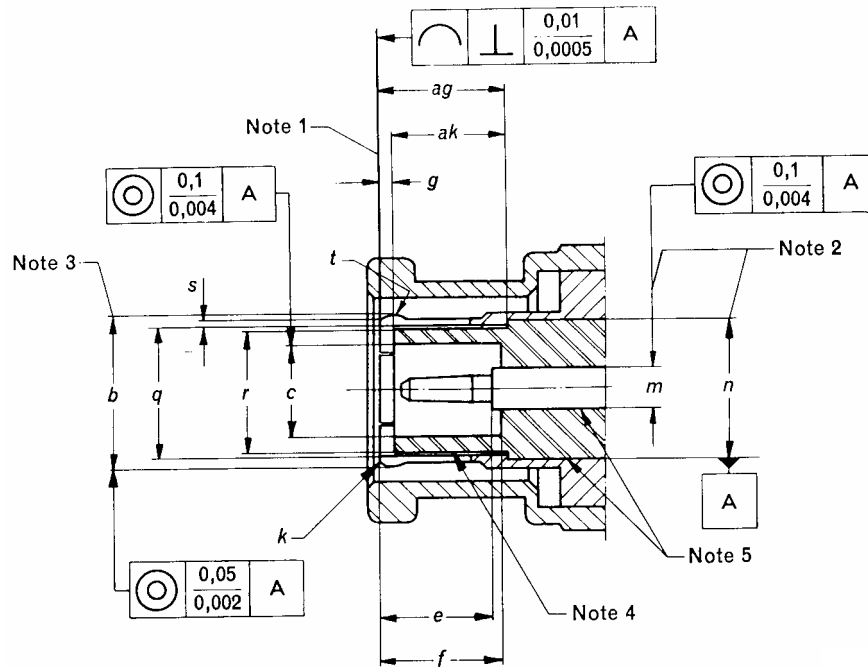


Figure 11 – Dimensions of connector (see Table 6)

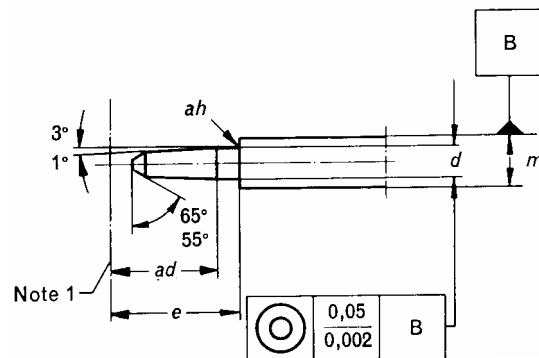


Figure 12 – Dimensions of centre contact (see Table 6)

Table 6 – Dimensions of centre contact

| Reference | mm | | Inch | | Note |
|--|-----------|------|------------|--------|-----------|
| | Min. | Max. | Min. | Max. | |
| <i>b</i> | 8,10 | 8,15 | 0,319 | 0,321 | 3/diam. |
| <i>c</i> | 4,88 | 4,93 | 0,192 | 0,194 | diam. |
| <i>d</i> | 1,35 | 1,37 | 0,0530 | 0,0541 | diam. |
| <i>e</i> | 5,31 | 5,38 | 0,209 | 0,212 | |
| <i>f</i> | 5,38 | 5,54 | 0,212 | 0,218 | |
| <i>g</i> | 0,15 | 0,30 | 0,006 | 0,012 | |
| <i>k</i> | 0,13 | 0,20 | 0,005 | 0,008 | rad. |
| <i>m</i> | 2,13 | 2,15 | 0,0837 | 0,0847 | 2/diam. |
| <i>n</i> | 6,99 | 7,01 | 0,2752 | 0,2760 | 2/diam. |
| <i>q</i> | 6,72 | 6,74 | 0,2645 | 0,2655 | diam. |
| <i>r</i> | 6,60 | 6,65 | 0,260 | 0,262 | diam. |
| <i>s</i> | 0,30 | — | 0,012 | — | plat/flat |
| <i>t</i> | — | 0,89 | — | 0,035 | rad. |
| <i>ad</i> | 3,66 | 3,98 | 0,144 | 0,157 | |
| <i>ag</i> | 5,31 | 5,36 | 0,209 | 0,211 | |
| <i>ah</i> | — | 0,13 | — | 0,005 | rad. |
| <i>ak</i> | 5,16 nom. | | 0,203 nom. | | |
| Dimensions of bayonet lock system, see 4.1.1, Figures 2, 3 and 4 | | | | | |
| NOTE 1 Mechanical and electric reference plane. Right-angled to the axis 0,01 mm (0,0005 in). | | | | | |
| NOTE 2 These diameters are for PTFE insulation with dielectric constant 2,02. Characteristic impedance of transmission line determined by diameters “ <i>m</i> ” and “ <i>n</i> ” shall be 50 Ω ± 0,2 Ω. | | | | | |
| NOTE 3 Dimensions before slotting: six slots spaced 60 ± 1° apart, 0,36 mm - 0,41 mm (0,014 in - 0,016 in)wide, 5,84 mm - 6,10 mm (0,230 in - 0,240 in) deep, After slotting and flaring the ID of the outer contact must be 6,718 mm to 6,744 mm (0,2645 in to 0,2655 in) when the OD of the outer contact is inserted into a ring gauge with an ID of 8,125 mm to 8,131 mm (0,3199 in to 0,3201 in). | | | | | |
| NOTE 4 If concentric, radial air gap 0,05 mm (0,002 in) nom. When contact is inserted into a ring gauge with an ID of 8,125 mm to 8,131 mm (0,3199 in to 0,3201 in). | | | | | |
| NOTE 5 Zero air gap. | | | | | |

5.2.2 Standard test connector with socket contact

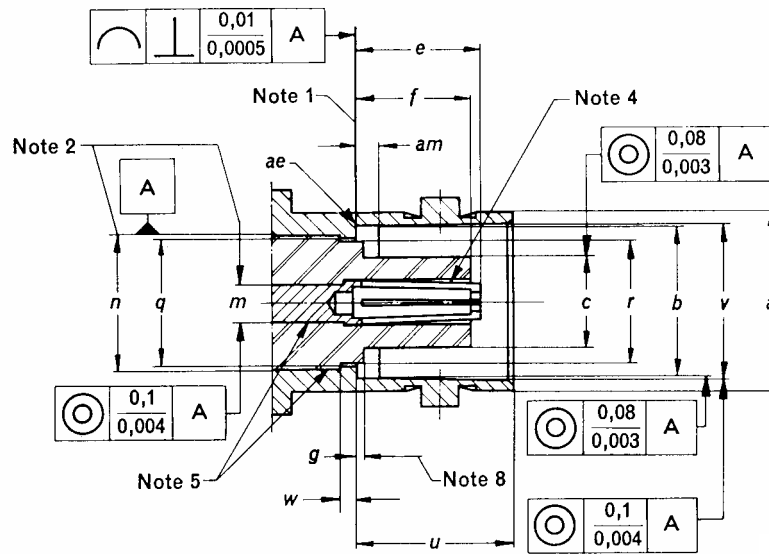


Figure 13 – Dimensions of connector (see Table 7)

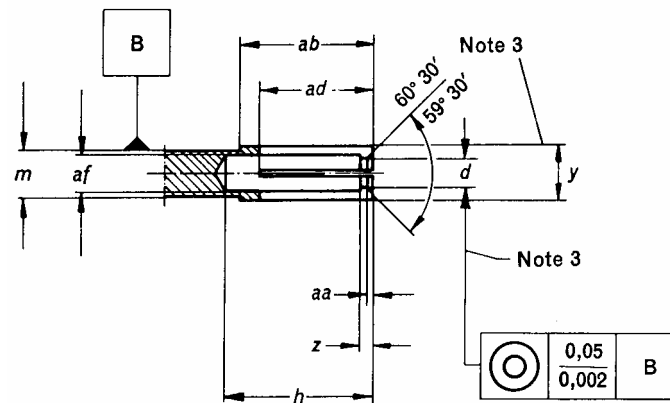


Figure 14 – Dimensions of centre contact (see Table 7)

Table 7 – Dimensions for standard test connector

| Reference | mm | | inch | | Note |
|---|-------|-------|--------|--------|---------|
| | Min. | Max. | Min. | Max. | |
| <i>a</i> | 9,60 | 9,68 | 0,378 | 0,381 | diam. |
| <i>b</i> | 8,10 | 8,15 | 0,319 | 0,321 | diam. |
| <i>c</i> | 4,67 | 4,72 | 0,184 | 0,186 | diam. |
| <i>d</i> | 1,356 | 1,361 | 0,0534 | 0,0536 | 3/diam. |
| <i>e</i> | 5,21 | 5,28 | 0,205 | 0,208 | |
| <i>f</i> | 5,08 | 5,23 | 0,200 | 0,206 | |
| <i>g</i> | 0,0 | 0,15 | 0,00 | 0,006 | 8 |
| <i>h</i> | 5,21 | – | 0,205 | – | |
| <i>m</i> | 2,13 | 2,15 | 0,0837 | 0,0847 | 2/diam. |
| <i>n</i> | 6,99 | 7,01 | 0,2752 | 0,2760 | 2/diam. |
| <i>q</i> | 6,71 | 6,76 | 0,264 | 0,266 | diam. |
| <i>r</i> | 6,58 | 6,68 | 0,259 | 0,263 | diam. |
| <i>u</i> | 8,36 | 8,46 | 0,329 | 0,333 | |
| <i>v</i> | 8,31 | 8,46 | 0,327 | 0,333 | diam. |
| <i>w</i> | 0,79 | 0,84 | 0,031 | 0,033 | |
| <i>y</i> | 2,16 | 2,18 | 0,0852 | 0,0859 | 3/diam. |
| <i>z</i> | 0,38 | 0,89 | 0,015 | 0,035 | |
| <i>aa</i> | 0,05 | 0,2 | 0,002 | 0,008 | |
| <i>ab</i> | 6,05 | 6,10 | 0,238 | 0,240 | |
| <i>ad</i> | 4,62 | 4,88 | 0,182 | 0,192 | |
| <i>ae</i> | – | 0,1 | – | 0,004 | rad. |
| <i>af</i> | 1,52 | 1,63 | 0,060 | 0,064 | diam. |
| <i>am</i> | 0,51 | 1,02 | 0,020 | 0,040 | |
| <p>For dimensions not given in this table, see 4.1.2</p> <p>NOTE 1 Mechanical and electric reference plane.</p> <p>NOTE 2 These diameters are for PTFE insulation with dielectric constant 2,02. Characteristic impedance of transmission line determined by diameters “<i>m</i>” and “<i>n</i>” shall be $50 \Omega \pm 0,2 \Omega$.</p> <p>NOTE 3 Four slots 0,18 mm - 0,23 mm (0,007in - 0,009 in) wide; between 90° 30' and 80° 30' apart; diameter “<i>y</i>” with 1,356 mm (0,0534 in) min.; 1,361 mm (0,0536 in) max.; pin gauge inserted after slotting and closing.</p> <p>NOTE 4 If concentric 0,02 mm (0,0008 in) radial air gap when mated with 1,359 mm (0,0535 in) diameter pin.</p> <p>NOTE 5 Zero air gap.</p> <p>NOTE 8 Insulator shall be flush or protruding.</p> | | | | | |

6 Outline dimensions

Under consideration.

7 Quality assessment procedures

7.1 General

The following subclauses provide recommended ratings, performance and test conditions to be considered when writing a detail specification (DS). They also provide an appropriate schedule of tests with minimum levels of conformance inspection.

7.2 Ratings and characteristics

This standard specified pin and socket connectors with bayonet lock with a nominal inner diameter of the outer conductor of 6,5 mm (0,256 in). Cable mounting connectors will function within specification requirements with 3 mm cables up to a frequency of at least 3 GHz, and may be used at higher frequencies if a reflection coefficient greater than 0,1 can be tolerated for straight connectors and 0,13 for right angle styles.

The connectors have a maximum working voltage of 500 V at sea level (125 V at 44 mbar/ 20 000 m altitude). Connection to the cable may be made either by crimping or soldering, depending upon design.

NOTE 1 Patterns for crimping are under consideration. Certain connectors have both barrier and panel seals.

NOTE 2 All voltages specified in this standard are r.m.s. values of a.c. voltages. All test voltages are a.c. voltages of 50 Hz to 60 Hz.

NOTE 3 For details of symbols, abbreviations and procedures, see 7.3.2.

Table 8 – Preferred climatic categories (see IEC 60068-1)

| Category | Designation letter* | Temperature range | Damp heat, steady state |
|--|---------------------|-------------------|-------------------------|
| 40/85/21 | A | –40 °C to +85 °C | 21 days |
| 40/155/21 | B | –40 °C to +155 °C | 21 days |
| 55/155/56 | C | –55 °C to +155 °C | 56 days |
| * To be included in the IEC type designation (see Clause 3). | | | |

Table 9 – Ratings and characteristics

| Ratings and characteristics | IEC 61169-1 subclause | Value | Remarks including any deviations from standard test methods |
|---|-----------------------|----------------------------|---|
| <i>Electrical</i> | | | |
| Nominal impedance | | 50 Ω | |
| Frequency range | | Up to 4 GHz | |
| – Grade 2 connectors | | | |
| Reflection factor | 9.2.1 | | |
| – straight styles ^a | | $\leq 0,13$ | |
| – right angle styles | | $\leq 0,15$ | |
| – component mounting styles | | As specified in the DS | |
| – solder bucket and PCB mounting styles | | As specified in the DS | |
| Centre contact resistance | 9.2.3 | | |
| – initial | | $\leq 1,5 \text{ m}\Omega$ | |
| – after conditioning | | $\leq 2,5 \text{ m}\Omega$ | |
| Outer conductor continuity ^a | 9.2.3 | | |
| – initial | | $\leq 1 \text{ m}\Omega$ | |
| – after conditioning | | $\leq 2 \text{ m}\Omega$ | |
| Insulation resistance ^a | 9.2.5 | | |
| – initial | | $\geq 5 \text{ G}\Omega$ | |
| – after conditioning | | $\geq 200 \text{ M}\Omega$ | |
| Proof voltage at sea level ^{b c} | 9.2.6 | | |
| – cables 60096 IEC 50-4 | | 1500 V | |
| – cables 60096 IEC 50-3 | | 1000 V | |
| – cables 60096 IEC 50-2 | | 750 V | |
| Proof voltage at 4,4 kPa ^{b c} | 9.2.6 | | 4,4 kPa approximately equivalent to 20 km |
| – cables 60096 IEC 50-4 | | 180 V | |
| – cables 60096 IEC 50-3 | | 180 V | |
| – cables 60096 IEC 50-2 | | 150 V | |
| Screening effectiveness (straight cabled connectors only) | 9.2.8 | 55 dB to 3 GHz | $Z_t \leq 178 \text{ m}\Omega$ |
| Discharge test (Corona) | 9.2.9 | $\geq 500 \text{ V}$ | Extinction voltage |
| – at sea level (cable 60096 IEC 50-3) | | | |
| <i>Mechanical</i> | | | |
| Centre contact captivation | 9.3.5 | | Maximum displacement 0,25 mm each direction |
| – axial force | | 15 N | |
| – torque | | na | |
| Engagement and separation force and torque, bayonet coupling | 9.3.6 | | |
| – axial force | | $\leq 20 \text{ N}$ | |
| – torque | | 0 to 0,25 Nm. | |
| Gauge retention force (resilient contacts) | 9.3.4 | | |
| – centre | | 0,57 N | |
| – outer | | 2,25 N | |
| Mechanical tests on cable fixing cable pulling, force minimum | 9.3.7 | | |
| – cables 60096 IEC 50-4 | | 300 N | |
| – cables 60096 IEC 50-3 | | 180 N | |
| – cables 60096 IEC 50-2 | | 100 N | |
| Cable torsion | 9.3.10 | | |
| – cables 60096 IEC 50-4 | | 0,40 Nm | |
| – cables 60096 IEC 50-3 | | 0,30 Nm | |
| – cables 60096 IEC 50-2 | | 0,15 Nm | |
| Tensile strength of coupling mechanism | 9.3.11 | 445 N | |
| Bending moment (and sharing force) | 9.3.12 | 1 Nm | Relative to reference plane |

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| Ratings and characteristics | IEC 61169-1 subclause | Value | Remarks including any deviations from standard test methods |
|--------------------------------|-----------------------|--|---|
| Vibration | 9.3.3 | 100 m/s ² 10 Hz – 2 000 Hz | 10 g _n acceleration |
| Bump | 9.3.13 | – | |
| Shock | 9.3.14 | 500 m/s ² ½ sin 6 ms | 50 g _n acceleration |
| <i>Environmental</i> | | | |
| Climatic category ^d | | 40/155/21 | |
| Sealing – non-hermetic | 9.4.5.1 | 1 cm ³ /h max. 100 kPa – 110 kPa differential | |
| Sealing – hermetic | 9.4.5.2 | 1 Pa cm ³ /s (10 ⁻⁵ bar cm ³ /s) 100 kPa – 110 kPa differential | |
| Salt mist | 9.4.6 | Duration of spraying: 48 h | |
| <i>Endurance</i> | | | |
| Mechanical | 9.5 | 500 operations | |
| High temperature ^d | 9.6 | 1 000 h at 155 °C | |

^a These values apply to basic connectors. They depend on the cable used. Relevant values are given in the DS.

^b Voltage values are r.m.s. values at 50-60 Hz, unless otherwise specified.

^c Cables used with these connectors may have values of lower performance than those given in this table.

^d For certain connectors the upper temperature limit is restricted by the cable characteristics. Reference should be made to the relevant cable specification.

7.3 Test schedule and inspection requirements

7.3.1 Acceptance tests

Table 10 – Acceptance tests

| | Test method IEC 61169-1 subclause | Assessment level M (higher) | | | | Assessment level H (lower) | | | |
|-------------------------------------|---|-----------------------------|----|-------|--------|----------------------------|----|-------|--------|
| | | Test Required | IL | AQL % | Period | Test Required | IL | AQL % | Period |
| <i>Group A1</i> | | | | | | | | | |
| Visual examination | 9.1.2 | a | II | 1,0 | | a | S3 | 1,5 | |
| <i>Group B1</i> | | | | | | | | | |
| Outline dimensions | 9.1.3.1 | a | S4 | 0,4 | | a | S3 | 4,0 | |
| Mechanical compatibility | 9.1.3.3 | a | II | 1,0 | | a | S3 | 1,5 | |
| Engagement and separation | 9.3.6 | a | S4 | 0,40 | Lot | a | S3 | 1,5 | Lot |
| Gauge retention (resilient contact) | 9.3.4 | ia | II | 1,0 | | ia | S3 | 1,5 | |
| Sealing, non-hermetic | 9.4.5.1 | ia | II | 0,65 | by | ia | S3 | 1,0 | by |
| Sealing, hermetic | 9.4.5.2 | ia | II | 0,015 | | ia | S3 | 0,025 | |
| Voltage proof | 9.2.6 | a | S4 | 0,40 | lot | a | II | 4,0 | lot |
| Solderability piece parts | 9.3.2.1.1 | ia | S4 | 0,40 | | ia | S3 | 4,0 | |
| Insulation resistance | 9.2.5 | a | S4 | 0,40 | | a | S3 | 4,0 | |

7.3.2 Periodic tests

There are no group C tests for levels H and M.

NOTE For details of symbols, abbreviations and procedures, see Table 11.

Table 11 – Periodic tests

| | Test method IEC 61169-1 subclause | Assessment level M (higher) | | | | Assessment level H (lower) | | | |
|---|---|-----------------------------|---------------------|-------------------------------|---------|----------------------------|---------------------|-------------------------------|---------|
| | | Test required | Number of specimens | Permitted failures per group# | Period | Test required | Number of specimens | Permitted failures per group# | Period |
| <i>Group D1 (d)</i> | | | 6 | 1 | 3 years | | 3 | 1 | 3 years |
| Solderability connector assemblies | 9.3.2.1.1 | ia | | | | ia | | | |
| Resistance to soldering heat | 9.3.2.1.2 | ia | | | | ia | | | |
| Mechanical tests on cable fixing | | | | | | | | | |
| – cable rotation (nutation) | 9.3.7.2 | ia | | | | ia | | | |
| – cable pulling | 9.3.8 | ia | | | | ia | | | |
| – cable bending | 9.3.9 | ia | | | | ia | | | |
| – cable torsion | 9.3.10 | ia | | | | ia | | | |
| <i>Group D2 (d)</i> | | | 6 | 1 | 3 years | | 3 | 1 | 3 years |
| Contact resistance, outer conductor and screen continuity | 9.2.3 | a | | | | a | | | |
| centre conductor continuity | | | | | | | | | |
| Vibration | 9.3.3 | a | | | | | | | |
| Damp heat, steady state | 9.4.3 | a | | | | a | | | |
| <i>Group D3 (d)</i> | | | 1* | 1 | 3 years | | 1* | 1 | 3 years |
| Dimensions piece-parts and materials | 9.1.3.2 | a | | | | a | | | |
| <i>Group D4 (d)</i> | | | 6 | 1 | 3 years | | 3 | 1 | 3 years |
| Mechanical endurance | 9.5 | a | | | | a | | | |
| High temperature endurance | 9.6 | a | | | | a | | | |
| Sulphur dioxide | 9.4.8 | na | | | | na | | | |
| <i>Group D5 (d)</i> | | | 6 | 1 | 3 years | | 3 | 1 | 3 years |
| Reflection factor | 9.2.1 | a | | | | a | | | |
| Screening effectiveness | 9.2.8 | a | | | | a | | | |
| Water immersion | 9.2.7 | ia | | | | ia | | | |

| | Test method IEC 61169-1 subclause | Assessment level M (higher) | | | | Assessment level H (lower) | | | |
|---|---|-----------------------------|---------------------|-------------------------------|---------|----------------------------|---------------------|-------------------------------|---------|
| | | Test required | Number of specimens | Permitted failures per group# | Period | Test required | Number of specimens | Permitted failures per group# | Period |
| <i>Group D6 (d)</i> | | | 6 | 1 | 3 years | | 3 | 1 | 3 years |
| Contact captivation | 9.3.5 | a | | | | a | | | |
| Rapid change of temperature | 9.4.4 | na | | | | na | | | |
| Climatic sequence | 9.4.2 | a | | | | a | | | |
| <i>Group D7 (d)</i> | | | 1§ | | 3 years | | 1§ | | 3 years |
| Resistance to solvents and contaminating fluids | 9.7 | ia | | | | ia | | | |
| Details of symbols, abbreviations and procedures: a = suggested as applicable ia = test suggested (if technically applicable) na = not applicable IL = Inspection Level AQL = Acceptable Quality Level * = one set of piece-parts each style and variant, unless using common piece parts # = for Qualification Approval (QA) a total of two failures only permitted for level H and 1 failure only for level M from groups D1 to D7 § = Group D7 – number of pairs for each solvent (d) = destructive tests – specimens shall not be returned to stock | | | | | | | | | |

7.4 Procedures

7.4.1 Quality conformance inspection

This shall consist of test groups A1 and B1 on a lot-by-lot basis.

7.4.2 Qualification approval and its maintenance

This shall consist of three consecutive lots passing test groups A1 and B1 followed by selection of specimens from the lots as appropriate. These specimens shall successfully pass the specified periodic D tests.

8 Instructions for preparation of detail specifications

8.1 General

Detail specifications (DS) writers shall use the appropriate BDS pro-forma. The following pages comprise the pro-forma BDS dedicated for use with type BNC connectors. As such, it will already have entered on it information relating to

- the basic specification number applicable to all the detail specifications covering connector styles of the type covered by the sectional specification;
- the connector series designation.

The specification writer should enter the details relating to the connector style/variant(s) to be covered as indicated. The numbers in brackets on the BDS pro-forma correspond to the following indications which shall be given.

8.2 Identification of the Detail specification

- (1) The name of the National Standards Organization (NSO) under whose authority the DS is published and, if applicable, the organization from whom the DS is available.
- (2) The relevant mark of conformity and the number allotted to the DS by the relevant national or international organization authorizing the DS
- (3) The number and issue number of the IEC/IECQ generic or sectional specification as relevant; also national reference if different.
- (4) If different from the IEC/IECQ number, any national number of the DS, date of issue and any further information required by the national system, together with any amendment numbers.

8.3 Identification of the component

- (5) Enter the following details:

Style: The style designation of the connector including type of fixing and sealing, if applicable.

Attachment: By deletion of the inapplicable options of cable/wire: given for centre and outer conductors.

Special features and markings: As applicable.

- (6) Enter details of assessment level and the climatic category.
- (7) A reproduction of the outline drawing and details of the panel piercing, if applicable. It shall provide the maximum envelope dimensions, also the position of the reference plane and, in the case of a fixed connector, the position of the mounting plane(s) relative to the front face of the connector.

Any maximum panel thickness limitations for fixed connectors shall be stated.

- (8) Particulars of all variants covered by the DS. As appropriate, the information shall include:
 - cable types (or sizes) applicable to each variant;
 - alternative plated or protective finishes;
 - details of alternative mounting flanges having either tapped or plain mounting holes;
 - details of alternative solder spills or solder buckets including, when applicable, those for use with Microwave Integrated Circuit (MIC) components.

8.4 Performance

- (9) Performance data listing the most important characteristics of the connector taking into account the recommended values of 7.2 in this specification. Deviations from the minimum requirements shall be clearly indicated. Non-applicable parameters shall be marked 'na'.

8.5 Marking, ordering information and related matters

- (10) Insert marking and ordering information as appropriate, together with details of related documents and any invoked structural similarity.

8.6 Selection of tests, test conditions and severities

- (11) 'na' shall be used to indicate non-applicable tests. All tests marked 'a' by the detail specification writer shall be mandatory.

When using the normal procedure with a dedicated BDS, the letter 'a' – for applicable – shall be entered in the 'Test required' column against each of the tests indicated as being mandatory in the test schedule as in 7.3 of this specification. Any additional tests required at the discretion of the specification writer shall also be indicated by an 'a'.

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The specification writer shall also indicate, when necessary, details of deviations from the standard test methods and test conditions, including any relevant deviations given in the test schedule of the sectional specification.

The qualification approval and conformance inspection shall be such that the National Supervising Inspectorate (NSI) shall be satisfied that they are appropriate and in line with those for other connectors within the system providing a reasonably comparable service.

8.7 Blank detail specification pro-forma for type BNC connector

The following pages contain the complete BDS pro-forma.

| | | |
|---|---|---|
| (1) | Page 1 of |  QC 222401 |
| ELECTRONIC COMPONENT OF ASSESSED QUALITY IN ACCORDANCE WITH GENERIC SPECIFICATION QC 220000 SECTIONAL SPECIFICATION QC 222400 NATIONAL REFERENCE | (4) ISSUE | |
| (5) Detail specification for Radio frequency coaxial connector of assessed quality | | type BNC |
| Style:..... | Special features and markings | |
| Method of cable/wire+ attachment | centre conductor – solder/crimp+ outer conductor – solder/clamp/crimp + + delete as appropriate | |
| (6) Assessment level..... | Characteristic impedance ... Ω | Climatic category...../...../...../ |
| (7) Outline and maximum dimensions | Panel piercing and mounting details | |
| (8) Variants | | |
| Variant No. | Description of variant | 60096 IEC |
| 01..... | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| Information about manufacturers who have components qualified to this detail specification is available in the current QC 001005 Qualified Product List. | | |

(9) Performance (including limiting conditions of use)

| Ratings and characteristics | | IEC 61169-1 (QC 220000) subclause | Value | Remarks including any deviations from standard test methods |
|--|--|---|--|---|
| <i>Electrical</i> | | | | |
| Nominal impedance | | |Ω | |
| Frequency range | | |GHz | Measurement frequency range |
| Reflection factor | | 9.2.1 | | |
| | Variant No. Designation 01..... | | | |
| Centre contact resistance | | 9.2.3 | ≤mΩ ≤mΩ | Initial After conditioning |
| Centre conductor continuity | 01..... | 9.2.3 |mΩmΩmΩmΩ | Resistance change due to conditioning |
| Outer contact continuity | | 9.2.3 | ≤mΩ ≤mΩ | Initial After conditioning |
| Insulation resistance | | 9.2.5 | ≥GΩ ≥GΩ | Initial After conditioning |
| + Proof voltage at sea level | 01..... | 9.2.6 |kVkVkVkV | 86 kPa - 106 kPa |
| + Proof voltage at 4,4 kPa | 01..... | 9.2.6 |VVVV |kPa (if not 4,4 kPa) |
| Screening effectiveness | 01..... | 9.2.8 |dB at....GHz | $Z_t \leq \dots \text{m}\Omega$ |
| Discharge test (corona) at sea level | 01..... | 9.2.9 | ≥ V ≥ V ≥ V ≥ V | Extinction voltage |
| ADDITIONAL ELECTRICAL CHARACTERISTICS | | | | |
| + Voltage values are r.m.s. values at 50 Hz - 60 Hz, unless otherwise specified. | | | | |

| Ratings and characteristics | | IEC 61169-1 (QC 220000) subclause | Value | Remarks including any deviations from standard test methods |
|---|---------|---|--|---|
| <i>Mechanical</i> | | | | |
| Soldering | | 9.3.2.1.1 | | |
| - bit size | | | | |
| Gauge retention resilient contacts | | 9.3.4.3 |N | |
| - inner contact | | |N | |
| - outer contact | | | | |
| Centre contact captivation | | 9.3.5 |N | |
| - axial force | | |mm | |
| - permitted displacement each direction | | |Nm | |
| - torque | | | | |
| Engagement and separation | | 9.3.6 | | |
| - axial force | | | | |
| Strength of coupling mechanism | | 9.3.11 |N | |
| Effectiveness of cable fixing against | | | | |
| - cable rotation | 01..... | 9.3.7 | Rotations | |
| | | | | |
| | | | | |
| | | | | |
| - cable pulling | 01..... | 9.3.8 |N | |
| | | | | |
| | | | | |
| | | | | |
| - cable bending | 01..... | 9.3.9 |Cycles | Length of cable mass |
| | | | | |
| | | | | |
| | | | | |
| - cable torsion | 01..... | 9.3.10 |Nm | |
| | | | | |
| | | | | |
| | | | | |
| Bending moment | | 9.3.12 |Nm | Relative to reference plane |
| Bumps total | | 9.3.13 |m/s ²to..... Hz | (.....g _n acceleration) |
| Vibration | | 9.3.3 |m/s ²to..... Hz | (.....g _n acceleration) |
| Shock | | 9.3.14 |m/s ²Shapems | (.....g _n acceleration) |
| ADDITIONAL MECHANICAL CHARACTERISTICS | | | | |

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| Ratings and characteristics | IEC 61169-1 (QC 220000) Subclause | Value | Remarks including any deviations from standard test methods |
|---|--|--|--|
| <i>Environmental</i> Climatic category Sealing non-hermetically sealed connectors Sealing hermetically sealed connectors Water immersion Salt mist ADDITIONAL ENVIRONMENTAL CHARACTERISTICS | 9.4.5.1 9.4.5.2 9.2.7 9.4.6 |/...../.....cm ³ /h 10 ⁻⁵ bar/cm ³ /h h | 100 kPa to 110 kPa pressure differential 100 kPa to 110 kPa pressure differential Duration of spraying |
| <i>ENDURANCE</i> Mechanical High temperature ADDITIONAL ENDURANCE CHARACTERISTICS | 9.5 9.6 |operationsh at.....°C | |
| <i>CHEMICAL CONTAMINATION</i> Resistance to solvents and contaminating fluids to be used. Applicable fluids. Sulphur dioxide | 9.7 9.4.8 | days | |

(10) Supplementary information

- Marking of the component: in accordance with 11.1 of IEC 61169-1 (QC 220000) in the following order of preference:
 - 1) Manufacturer code:
 - 2) Manufacturing date code: year/week
 - 3) Component identification: Variant No. / Identification
Designation
.....
.....
.....
.....
.....
.....
.....
 - Marking and contents of package: in accordance with 11.2 of IEC 61169-1
 - 1) Information prescribed in 11.1 of IEC 61169-1 detailed above
 - 2) Nominal characteristic impedance Ω
 - 3) Assessment level code letter
 - 4) Any additional marking required
 - Ordering information
 - 1) Number of the detail specification IECQC 222XXX...../Variant code
 - 2) Assessment level code letter
 - 3) Body finish (if more than one listed)
 - 4) Any additional information or special requirements
 - Related documents (if not included in IEC 61169-1 or sectional specification):
.....
.....
 - Structural similarity in accordance with 10.2.2 of IEC 61169-1
- NOTE Relevant information on a basic style should be entered as variant 01.

Annex A (normative)

Information for interface dimensions of 75 Ω characteristic impedance connector with unspecified reflection factor

A.1 Dimensions – General purpose connectors

The following interface dimensions for 75 Ω BNC connectors ensure that these connectors will mate with the 50 Ω BNC connectors described in the standard in an non-destructive manner. Inch dimensions are original dimensions.

A.2 Pin connector (for dimensions see Table A.1)

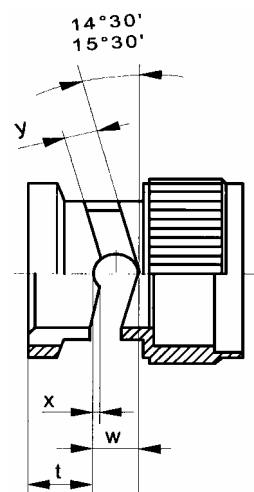
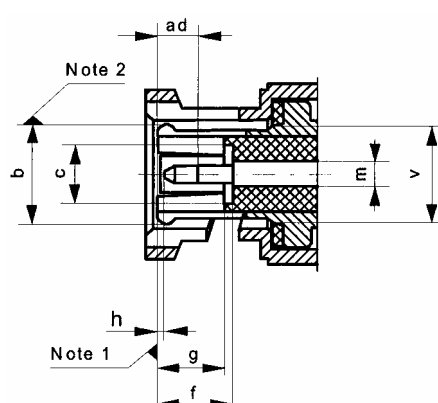


Figure A.1 – Connector with pin centre contact Figure A.2 – Details of bayonet lock

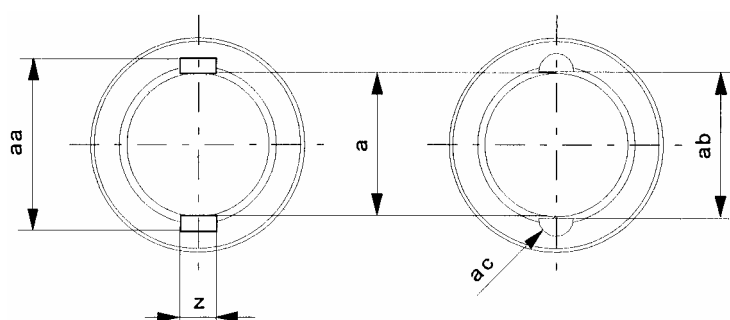


Figure A.3a

Figure A.3b

Figure A.3 – Details of alternative coupling grooves

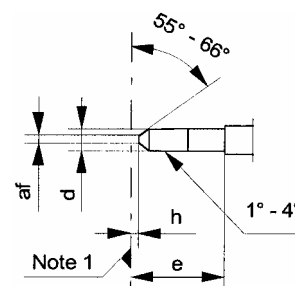


Figure A.4 – Details of pin
centre contact

Table A.1 – Dimensions for pin connector

| Ref. | Mm | | in | | Notes |
|---|-------|-------|-------|-------|----------|
| | Min. | Max. | Min. | Max. | |
| a | 9,78 | 9,91 | 0,385 | 0,390 | 6/diam |
| b | – | – | – | – | 2/6diam. |
| c | 4,83 | – | 0,190 | – | 3/6/diam |
| d | 1,32 | 1,37 | 0,052 | 0,054 | 3/diam. |
| e | 5,33 | – | 0,210 | – | |
| f | 5,28 | 5,79 | 0,208 | 0,228 | 4 |
| g | 4,30 | 5,30 | 0,169 | 0,209 | 3 |
| h | 0,08 | 1,02 | 0,003 | 0,040 | |
| m | 2,06 | 2,21 | 0,081 | 0,087 | diam |
| t | 4,47 | 4,67 | 0,180 | 0,184 | |
| v | – | 8,18 | – | 0,322 | 6/diam |
| w | 3,15 | – | 0,124 | – | |
| x | 0,46 | 0,56 | 0,018 | 0,022 | |
| y | 2,31 | 2,46 | 0,091 | 0,097 | |
| z | 2,31 | 2,46 | 0,091 | 0,097 | 5 |
| aa | 11,76 | 12,01 | 0,463 | 0,473 | 5 |
| ab | 10,01 | 10,16 | 0,394 | 0,400 | 5 |
| ac | 1,14 | 1,24 | 0,045 | 0,049 | 5/rad |
| ad | – | 3,86 | – | 0,152 | |
| af | – | 0,64 | – | 0,025 | diam. |
| NOTE 1 Mechanical and electrical reference plane. | | | | | |
| NOTE 2 Slotted and flared to meet electrical and mechanical requirements. | | | | | |
| NOTE 3 Reference c and reference g are applicable only when the dielectric support is counterbored. | | | | | |
| NOTE 4 Reference f also specifies the end of the dielectric support that is not counterbored. | | | | | |
| NOTE 5 It is permitted to use either Figure A.3a or Figure A.3b. | | | | | |
| NOTE 6 Diameters on mmC shall be on or be capable of taking a common axis. | | | | | |

A.3 Socket connector (for dimensions see Table A.2)

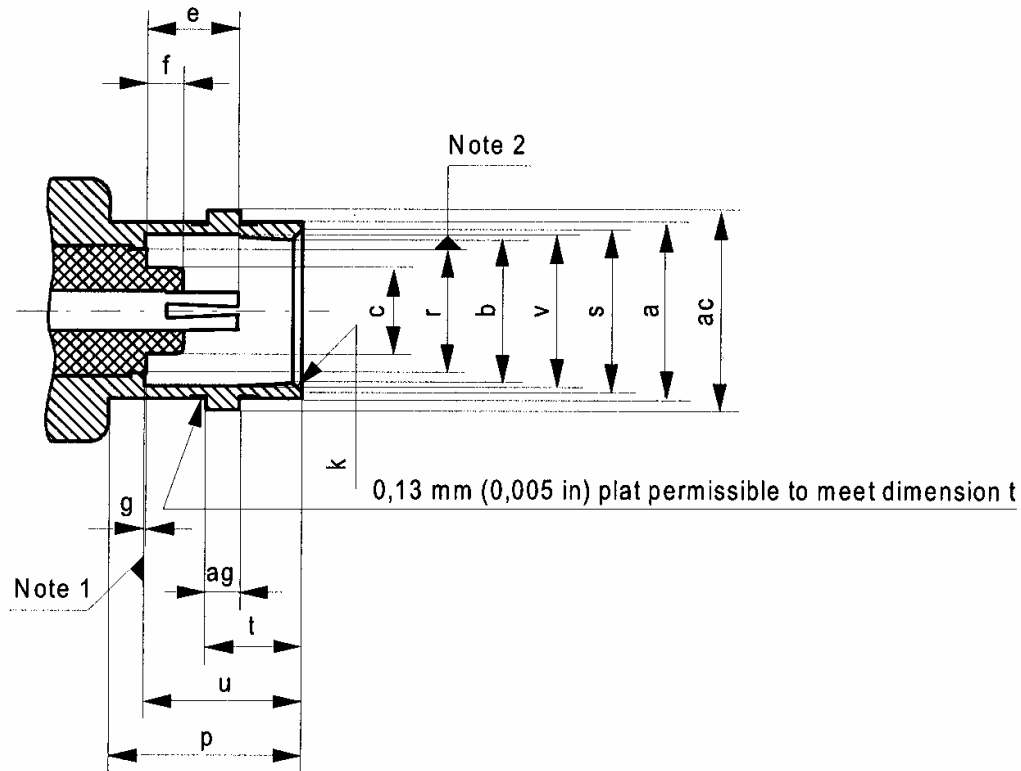


Figure A.5 – Connector with socket centre contact

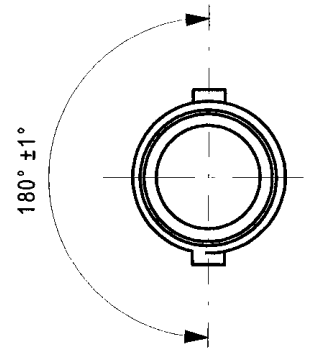


Figure A.6 – Position of coupling studs

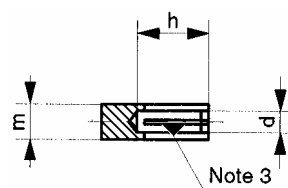


Figure A.7 – Details of socket centre contact

Table A.2 – Dimensions for socket connector

| Ref. | Mm | | in | | Notes |
|---|-------|-------|-------|-------|----------|
| | Min. | Max. | Min. | Max. | |
| a | 9,60 | 9,70 | 0,378 | 0,382 | 5/diam |
| b | 8,10 | 8,15 | 0,319 | 0,321 | 5/diam |
| c | – | 4,72 | – | 0,186 | 5/diam |
| d | – | – | – | – | 3/5/diam |
| e | 4,72 | 5,23 | 0,186 | 0,206 | |
| f | – | 2,31 | – | 0,091 | |
| g | – | 0,15 | – | 0,006 | 8 |
| h | 4,95 | – | 0,195 | – | |
| k | – | – | – | – | 4 |
| m | 1,88 | 2,29 | 0,074 | 0,090 | diam |
| p | 10,52 | – | 0,414 | – | |
| r | – | 6,50 | – | 0,256 | 2/diam |
| s | 8,79 | 9,04 | 0,346 | 0,356 | diam |
| t | 5,18 | 5,28 | 0,204 | 0,208 | |
| u | 8,31 | 8,51 | 0,327 | 0,335 | |
| v | 8,31 | 8,46 | 0,327 | 0,333 | 5/diam |
| ac | 10,97 | 11,07 | 0,432 | 0,436 | 5 |
| ag | 1,91 | 2,06 | 0,075 | 0,081 | diam |
| <p>NOTE 1 Mechanical and electrical reference plane.</p> <p>NOTE 2 Applies only when dielectric extends beyond reference plane.</p> <p>NOTE 3 Slotted and closed to meet electrical and mechanical requirements.</p> <p>NOTE 4 Chamfer or radius.</p> <p>NOTE 5 Diameters on mmC shall be on or capable of taking up common axis.</p> | | | | | |

Bibliography

IEC 60068-2-1:1990, *Environmental testing – Part 2: Test – Tests A: Cold*

IEC 60068-2-2:1974, *Basic environmental testing procedures – Part 2: Tests – Test B: Dry heat*

IEC 60068-2-11:1981, *Basic environmental testing procedures – Part 2: Tests – Test Ka: Salt mist*

IEC 60068-2-13:1983, *Basic environmental testing procedures – Part 2: Tests – Test M: Low air pressure*

IEC 60068-2-14:1984, *Basic environmental testing procedures – Part 2: Tests – Test N: Change of temperature*
Amendment 1 (1986)

IEC 60068-2-20:1979, *Basic environmental testing procedures – Part 2: Test – Test T: Soldering*

IEC 60068-2-30:2005, *Environmental testing – Part 2-30: Tests. Test Db: Damp heat, cyclic (12 h + 12 h cycle)*

IEC 60068-2-78:2001, *Environmental testing – Part 2-78: Tests - Test Cab: Damp heat, steady state*

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Amendments Issued Since Publication

| Amendment No. | Date of Issue | Text Affected |
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Telephones

| | | |
|----------|---|--|
| Central | : Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002 | { 2323 7617 2323 3841 |
| Eastern | : 1/14, C.I.T. Scheme VII M, V.I.P. Road, Kankurgachi KOLKATA 700054 | { 2337 8499, 2337 8561 2337 8626, 2337 9120 |
| Northern | : SCO 335-336, Sector 34-A, CHANDIGARH 160022 | { 260 3843 260 9285 |
| Southern | : C.I.T. Campus, IV Cross Road, CHENNAI 600113 | { 2254 1216, 2254 1442 2254 2519, 2254 2315 |
| Western | : Manakalaya, E9 MIDC, Marol, Andheri (East) MUMBAI 400093 | { 2832 9295, 2832 7858 2832 7891, 2832 7892 |

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